REMARKS

The specification was objected to because the parent application was not cited. The reference to the parent appears in item 7 of the Rule 53(b) application under the old practice. The statement has been added by amendment and updated to include the patent number of the parent.

The rejection of claim 13 under 35 USC 103(a) over Hearn et el '457 (Hearn) in view of McDaniel et al appl. (McDaniel) is respectfully traversed.

Hearn feeds naphtha to a first distillation column reactor which acts as a depentanizer or dehexanizer with the lighter material containing most of the olefins and mercaptans being boiled up into a first distillation reaction zone where the mercaptans are reacted with diolefins to form sulfides which are removed in the bottoms along with any higher boiling sulfur compounds. The bottoms, which contain the sulfides, thiophenes and heavier mercaptan (see col. 2, lines 46-56; col. 3, lines 51-53; col. 4, lines 4-5, lines 41-43; col. 6, lines 62-64; col. 7, lines 6-20 and claims), are subjected to hydrodesulfurization in a second distillation column reactor where the sulfur compounds are converted to H_2S and removed. The lighter fraction containing most of the olefins is not subjected to the more harsh hydrogenation conditions of the second reactor. The point of Hearn is the removal of sulfur compounds, without reducing the olefin content of the feed.

Thus, in Hearn the stream containing the thiophenes are in the bottom stream, there is no suggestion in that reference that they be anywhere else.

In the present invention It was been found that the light FCC naphtha cut just below the light fraction also contains mercaptans and a significant amount of thiophenes. The mercaptans in this cut may be removed by the thioetherification, **but the thiophenes remain** and this cut will not meet sulfur requirements. (Spec. page 4, lines 7-10). The

thioetherification carried in the present process converts mercaptans to sulfides by the reaction with diolefins. The sulfides are heavy and are removed in the bottoms. The thiophenes in the present process do not react to form the heavy sulfides.

While it is true that McDaniel carries out a reaction of a hydrocarbon stream containing thiophenes then splits the product into at least three streams for further handling, it also true that the thiophenic compounds undergo conversion to the refractory sulfur compounds (para. 49) which are in the third fraction (paragraph 0051, line 5-9) which also contains the thiophenic compounds and which is subjected to the vigorous hydrodesulfurization (paragraph 0051 lines 10-end). Thus, McDaniel is treating essentially the same fraction as Hearn, i.e., the bottoms, with no suggestion in the references to do anything else. However, the reactions in Hearn is not the same as McDaniel since the thiophenic compounds react (are converted) in the McDaniel process. It is respectfully submitted that the combination of references, is appropriate fails to make out a *prima facie* case of obviousness. Furthermore, there would appear to be no thiophenes in McDaniel's intermediate stream, hence the proposed rationale that it would be obvious to separate the Hearn product into 3 streams and to treat the intermediate stream, as McDaniel (the third or heavy stream) is rebutted by the facts that the intermediate stream of Hearn can be expected to contain thiophene, while the intermediate stream of McDaniel does not.

There would be no incentive to split Hearn's product into 3 streams based on McDaniel since as is taught by McDaniel, the refractory adducts and thiophenic compounds are being treated in the bottom fraction. It is not shown or remotely suggested by either reference that a thiophene cut should te separately removed and treated. The thiophenes would not require the strong hydrogenation of the refractory bottoms of either Hearn or McDaniel. Thus, the olefin content and the hence the octane rating of the overall streams will be greater by having

the thiophene treated separately from the other bottoms.

Claim 13 is very clear that the thiophenes are in the intermediate fraction not the bottoms, which is removed and treated:

"(d) removing an intermediate naphtha as a side draw from said distillation column reactor containing thiophene, diolefins boiling in the range of thiophene and mercaptans boiling in the range of thiophene...

(f) feeding said intermediate naphtha to a single pass fixed bed reactor containing a hydrodesulfurization catalyst where substantially all of any remaining sulfides and other organic sulfur compounds are reacting with hydrogen to form hydrogen sulfide."

It is well settled that a rejection based on § 103 must rest upon a factual basis rather than conjure or speculation. "Where the legal conclusion of [of obviousness] is not supported by the facts it cannot stand." *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967); see also *In re Sporck*, 301 F.2d 686, 690, 133 USPQ 360,364 (CCPA 1962). "Obviousness cannot be established by combining teachings of the prior art to produce the claimed invention, *absent* some teaching suggestion or incentive supporting the combination." *In re Geiger*, 2 USPQ2d 1276 (CAFC 1987). Hence, without the requisite teaching, suggestions or incentives there is no *prima facie* case and the rejection must fail. The court was addressing piecemeal combination of teachings, which could be argued met the claims, however, the proposed combination does not even meet the claims of the present invention and does not even rise to the level of putative *prima facie* case. See also *In re Fine*, 5 USPQ2d 1596 and *Ex parte Levengood*, 28 USPQ2d 1300 (BdPatApp 1993). It is submitted that the total failure of either reference to express any interest in the thiophene cut, but rather to treat this as just another component of the heavies fails to provide any incentive to rearrange and modify the two reference processes to arrive at the present claimed invention.

Claim 13 was reject for double patenting over claim 1 of commonly owned U.S. Par, No, 6, 824,676. A terminal disclaimer and fee is submitted here.

It is respectfully submitted that since the combined references fail to make out a *prima facie* of obviousness of the present invention and in any event the teachings of the references as presented above rebuts any preliminary presumption of *prima facie* obviousness, and allowance of claim 13 is requested in due course.

Respectfully Submitted

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